WHAT IS CLAIMED IS:

1. (Original) A method of fabricating an integrated optical interconnection between components, comprising:

forming a first optical waveguide in a semiconductor substrate;

forming a first layer of dielectric material disposed above the optical waveguide;

forming an optical interconnect in the first dielectric layer and disposed proximate to the first optical waveguide;

forming a second layer of dielectric material disposed above the optical interconnect;

forming a second optical waveguide in the second layer of dielectric material and disposed proximate to the first optical waveguide; and

forming a conductive contact disposed above and proximate the second optical waveguide, the metal contact operable to make electrical connections between the components.

2. (Original) The method, as set forth in claim 1, further comprising placing a component on the optical interconnect circuit and electrically coupling the component to the metal contact.

3. (Original) The method, as set forth in claim 1, further comprising encapsulating the optical interconnect circuit.

4. (Original) The method, as set forth in claim 1, wherein forming a first optical waveguide in a semiconductor substrate comprises implanting an impurity of a predetermined type in the semiconductor substrate.

5. (Original) The method, as set forth in claim 1, wherein forming an optical interconnect in the first dielectric layer comprises implanting an impurity of a predetermined type in the first dielectric layer.

6. (Original) The method, as set forth in claim 1, wherein the first optical waveguide overlaps the optical interconnect in a first region, the second optical waveguide overlaps the optical interconnect in a second region, and the first and second regions coincide.

7. (Original) The method, as set forth in claim 1, wherein the first optical waveguide overlaps the optical interconnect in a first region, the second optical waveguide overlaps the optical interconnect in a second region, and the first and second regions do not coincide.

8. (Original) The method, as set forth in claim 1, wherein the first optical waveguide and the second optical waveguide are perpendicular with one another.

9. (Original) The method, as set forth in claim 1, wherein the first optical waveguide and the second optical waveguide are parallel with one another.

10. (Original) The method, as set forth in claim 1, wherein forming a first optical waveguide in a semiconductor substrate comprises implanting an impurity into predetermined regions of the semiconductor substrate using a patterned mask defining the predetermined regions of the semiconductor substrate.

11. (Original) The method, as set forth in claim 1, wherein forming an optical interconnect in the first dielectric layer comprises implanting an impurity into predetermined regions of the first dielectric layer using a patterned mask defining the predetermined regions of the first dielectric layer.

12. (Original) The method, as set forth in claim 1, wherein forming a second optical waveguide in the second layer of dielectric material comprises implanting an impurity into predetermined regions of the second dielectric layer using a patterned mask defining the predetermined regions of the second dielectric layer.

13. (Original) The method, as set forth in claim 1, further comprising forming additional optical waveguides and optical interconnects disposed above the second optical waveguide.

14. (Original) The method, as set forth in claim 1, further comprising forming a second conductive contact disposed below and proximate the first optical waveguide, the second conductive contact operable to make electrical connections between the components.

15. (Currently Amended) The method, as set forth in claim ~~17~~ 1, further comprising:

securing a first circuit component on the metal contact and forming an electrical connection between the first circuit component with the metal contact; and

securing at least one second circuit component on the second metal contact and forming electrical connection between the at least one second circuit component with the second metal contact.

16. (Original) A method of making an optical integrated circuit, comprising:

forming a first dopant region operable to function as an optical waveguide in a substrate;

forming a first layer of dielectric material disposed above the first dopant region;

forming a second dopant region in the first dielectric layer and disposed above and proximate to the first dopant region, the second dopant region operable to optically couple to the first dopant region;

forming a second layer of dielectric material disposed above the second dopant region; and

forming a third dopant region in the second layer of dielectric material and disposed above and proximate to the second dopant region, the third dopant region operable to optically couple to the second dopant region.

17. (Original) The method, as set forth in claim 16, forming a conductive contact disposed above and proximate the third dopant region, the conductive contact operable to make electrical connections to a component placed thereon.

18. (Original) The method, as set forth in claim 16, wherein forming the third dopant region comprises forming a third dopant region generally perpendicular with the first dopant region.

19. (Original) The method, as set forth in claim 16, wherein forming the third dopant region comprises forming a third dopant region generally parallel with the first dopant region.

20. (Original) The method, as set forth in claim 16, wherein forming the first, second and third dopant regions comprises using patterned masks defining outlines of the dopant regions for implantation.

21. (Original) The method, as set forth in claim 17, wherein the first dopant region is formed in a semiconductor substrate disposed above a semiconductor layer, and the method further comprising:

removing the semiconductor layer disposed below the semiconductor substrate; and

forming a second conductive contact disposed below and proximate the first dopant region, the second conductive contact operable to make electrical connections with a second component placed thereon.

22. (Original) The method, as set forth in claim 21, further comprising:

securing a first circuit component on the conductive contact and forming an electrical connection between the first circuit component with the conductive contact; and

securing at least a second circuit component on the second conductive contact and forming electrical connection between the second circuit component with the second conductive contact.

23. (Original) An optical integrated circuit, comprising:

a first optical waveguide formed in a first dielectric layer operable to conduct optical signals;

an optical interconnect formed in a second dielectric layer disposed above the first dielectric layer; and

a second optical waveguide formed in a third dielectric layer disposed above the second dielectric layer and operable to conduct optical signals, whereby the optical interconnect is operable to conduct optical signals from the first optical waveguide to the second optical waveguide.

24. (Original) The optical integrated circuit, as set forth in claim 23, wherein the optical interconnect has a disk configuration.

25. (Original) The optical integrated circuit, as set forth in claim 23, wherein the optical interconnect has a ring configuration.

26. (Original) The optical integrated circuit, as set forth in claim 23, wherein the first optical waveguide and the second optical waveguide are oriented at a predetermined angle with one another.

27. (Original) The optical integrated circuit, as set forth in claim 23, wherein the first optical waveguide and the second optical waveguide are generally parallel with one another.

28. (Original) The optical integrated circuit, as set forth in claim 23, wherein the first optical waveguide and the second optical waveguide are generally perpendicular to one another.

29. (Original) The optical integrated circuit, as set forth in claim 23, wherein the first optical waveguide comprises a dopant region formed in the first dielectric layer.

30. (Original) The optical integrated circuit, as set forth in claim 23, wherein the second optical waveguide comprises a dopant region formed in the third dielectric layer.

31. (Original) The optical integrated circuit, as set forth in claim 23, wherein the optical interconnect comprises a dopant region formed in the second dielectric layer.

32. (Original) The optical integrated circuit, as set forth in claim 23, further comprising a conductive contact disposed above the second optical waveguide, the conductive contact operable to make optoelectronic contact with the second optical waveguide.

33. (Original) The optical integrated circuit, as set forth in claim 23, further comprising a second conductive contact disposed below the first optical waveguide, the conductive contact operable to make optoelectronic contact with the first optical waveguide.

34. (Original) The optical integrated circuit, as set forth in claim 33, further comprising:

a first circuit component disposed above the second optical waveguide and electrically coupled to the conductive contact; and

a second circuit component disposed below the second optical waveguide and electrically coupled to the second conductive contact.

35. (Original) A method of making an optical integrated circuit, comprising:

forming a sacrificial layer above a substrate;

forming a first dielectric layer above the sacrificial layer;

forming a first dopant region operable to function as an optical waveguide in the first dielectric layer;

forming a second dielectric layer disposed above the first dielectric layer;

forming a second dopant region in the second dielectric layer and disposed above and proximate to the first dopant region, the second dopant region having a circular outline and operable to optically couple to the first dopant region;

forming a third dielectric layer disposed above the second dielectric layer;

forming a third dopant region in the third dielectric layer and disposed above and proximate to the second dopant region, the third dopant region operable to optically couple to the second dopant region;

removing the sacrificial layer;

forming a first conductive contact above the third dielectric layer; and

forming a second conductive contact below the first dielectric layer.

36. (Original) The method, as set forth in claim 35, further comprising:

securing a first circuit component on the first conductive contact and forming an electrical connection between the first circuit component with the first conductive contact; and

securing a second circuit component on the second conductive contact and forming electrical connection between the second circuit component with the second conductive contact.